

# NNSA Nuclear Criticality Safety Program

2030 Complex of the Future

Boston, ANS

June 2007

# Agenda

8:00 AM – Welcome and Introductions

8:10 AM – Communicating with the NCSP Website

8:20 AM – Report on the First C<sub>e</sub>dT Meeting

8:40 AM – Process for Requesting New Critical-Subcritical Integral Experiments

• 9:10 AM – Break

9:20 AM – NCSP Demonstration of the CED-0 Request Form

9:50 AM – Final Questions and Dialog

# Communications

The NNSA NCSP strives to remain aware of the technical infrastructure needs of the DOE criticality safety community through various means of communication and feedback while maintaining programmatic transparency to facilitate interaction and enhance trust in the NCSP among all stakeholders.

*“Transparent Responsiveness”*

# Recent Additions to the NCSP Website

- Near Real-Time Updates of NCSP Activities
  - CSSG Taskings and Responses
  - NDAG Taskings and Responses
  - Quarterly Activity/Milestone Summaries for All NCSP Task Elements
  - Monthly CEF Updates
  - Online Registration for the LLNL Hands-On Criticality Safety Course

# NCSP Information Available on the Website

- Five-Year Plans
- CSSG Charter, Policies and Membership
- CSCT Charter and Membership
- Schedule of NCSP Activities
- NCSP Accomplishments
- 'Crit-Spam' – Breaking News Items of Interest to the Criticality Community
- LLNL Course Schedule and Registration
- Interactive Requests for Integral Experiments

# *Transparent Responsiveness*

Contacts for suggestions and requests for NCSP  
services and products are:

Todd Taylor – EndUser Chair

Nichole Ellis – NCSP EndUser Liaison

Chuck Lee – NCSP Webmaster

Jerry McKamy – NNSA NCSP Manager

# First C<sub>e</sub>dT Meeting

- Kickoff of the Critical-Subcritical Experiment Design Team (C<sub>e</sub>dT)
- Purpose of the March 13-14 Meeting:
  - Identify the First Critical Experiment Campaigns at CEF Important to the NNSA
  - Develop a Process for Identifying, Designing and Approving all New Integral Experiments

# Invited Attendees

- Blair Briggs, ICSBEP
- Kevin Carroll, Y-12
- Steve Clement, CEF
- Nichole Ellis, NCSP & EndUsers
- Jim Felty, NCSP
- Dave Heinrichs, LLNL, CSSG & NDAG
- Calvin Hopper, ORNL & CSSG
- Jerry McKamy, NCSP
- Dick McKnight, NDAG
- Cecil Parks, ORNL



# Priority Experiments Supporting NNSA

1a. Lucite Reflected Subcrits in 2008

1a. Nickel or Tungsten Reflected Subcrits to follow

1b. HEU Moderated Spherical Lattice Using Rocky Flats Shells (CEF Startup – 2010 tentatively)

1c. Vanadium Foils and Plates (CEF Startup)

1d. Borabond Criticals Supporting Y-12 UPF and ES3100 Shipping Container (CEF Startup)

2. Flat Top Gap Experiments

3. Bare Ball HEU (supporting Np reference exp.)

# Purpose of the C<sub>e</sub>dT Process

The purpose of the new experiment proposal, design and approval process is to ensure that the EndUser's nuclear data validation needs are well understood and met by integrating all the capabilities of the NCSP to design and approve the experiment consistent with the Guiding Principles of Integrated Safety Management.

# Elements of the C<sub>e</sub>dT Process

- Identify Nuclear Data Validation Needs Precisely
- Assess the Available Experimental Materials and CEF Capabilities for the Data Need
- Include Tsunami in Experiment Design Process
- Ensure ICSBEP Publication
- Ensure Quality/Precision of the Exp. In Design and Execution (QA/QC)
- Establish an Ongoing Transparent Process
- Federal NCSP Operations Authorization of Integral Experiments

# Key Phases of the Experiment Design and Approval Process

The NCSP Manager will approve Critical/Subcritical Experiment Decision (CED) steps to ensure that the EndUser's needs are met. These are:

CED-0: Mission Need

CED-1: Form the C<sub>e</sub>dT; Conceptual Design

CED-2: Final Experiment Design

CED-3: Approve Execution as Part of NCSP  
Five-Year Plan Process

CED-4: Analysis and Publication of the Data in  
ICSBEP Handbook

# Overview of the CED Process

## ➤ CED-0 Mission Need

- Interactive Web Request Process for Integral Experiments
- Virtually Any DOE EndUser Can Submit a Request at any Time
- Transparent Process
- Prompt Feedback on Progress of Request
- Triggers NCSP Manager Review and Subsequent NDAG and ICSBEP Review
- Interactions with NDAG and the EndUser
- Ensures that Existing ICSBEP Benchmarks and Data Are Not Currently Available to Meet EndUser's Need and a New Integral Experiment is Justified; If Existing Data are Adequate the NDAG Helps the EndUser to Understand and Utilize the Data for the Application
- Formal Approval by NCSP Manager

# Overview of the CED Process

- CED-1 Conceptual Experiment Design
  - The Approved CED-0 is Forwarded to the CEF Group Leader
  - The CEF Group Leader Forms the C<sub>e</sub>dT:
    - EndUser (Requestor)
    - Principal Investigator (CEF)
    - S/U (Tsunami) Analysis Expert (ORNL)
    - NDAG Member
    - ICSBEP Member

# CED-1 (cont.)

## ➤ Attributes of CED-1

- Iterative Team Approach
- S/U Analysis Ensures Experiment Matches Application and Provides Useful New Data
- Two to Three Month Process
- May Select Subcritical Experiment if Critical Experiment Proves Impractical
- Prepare a Report Documenting These Attributes and Submit to NCSP Manager
- CED-1 Formally Approved by NCSP Manager

# Overview of the CED Process

## ➤ CED-2 Final Experiment Design

- Prepare Detailed Experimental Plan
- Analyses of the Final Experiment Design  
Demonstrate that the Validation Need Is Met and that Estimates of the Precision and Bias are Acceptably Small (QA/QC Step BEFORE Experiment is Conducted)
- Resource Loaded Schedule for Conducting the Campaign is Prepared
- Report Submitted to NCSP Manager for Approval



# Overview of the CED Process

## ➤ CED-3 Conduct the Experiment

- Approval to Conduct the Experiment Integrated into Annual NCSP Five-Year Plan Preparation and Funding Cycle
- CED-2 Packages Should Be Approved by March Each Year to Get Funding Priority for Following FY

## ➤ CED-4 Experiment Closeout

- Analysis (including S/U) Completed
- Benchmark Prepared and Approved
- Published in ICSBEP Handbook

# Request for Integral Experiments

- Cite specific application not generic high level programmatic statement (i.e. 'storage' or 'EM' etc.)
- Requires a detailed process description (similar to Section II.B of 3007-2007)
- Describe the driver for the experiment (Efficiency, Regulatory Risk, Compliance, Criticality Safety)
- State a realistic need date (~2-4yrs lead)
- User must do homework to verify that existing benchmark data do not meet the need and demonstrate that in the request
- **User responsible for ensuring and certifying that all information provided is unclassified and approved for public release**
- Contact the NCSP Manager directly for classified requests
- The request process will be iterative between the EndUser, the NCSP Manager, and the NDAG until CED-0 Approved.
- Website will maintain a history of the request with all actions noted.

# Wrap Up

- Planning for three critical experiments to get through CED-1 process in FY08.
- Still shooting for FY10 startup of critical assembly operations at DAF
- Test drive the beta version of the Integral Experiments Request Form and let's work through the bugs!
- Contact Hazel Slemmons with comments and suggestions about the Integral Experiments Request process/form.